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AUTHOR Andersen, Barbara L.; And Others
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ABSTRACT

Examined in two studies--one involving three developmentally retarded children, the other involving two first grade children--were strategies for promoting transfer of newly acquired skills from a structured, one-to-one tutoring setting to an unstructured setting where children work independently. Before generalization training was begun, little of the behavior established during training was exhibited in the classroom or when the child was left alone to work independently; however, after generalization training was completed, classroom performance equalled that under one-to-one supervision. (SBH)

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PROGRAMMING GENERALIZATION THROUGH STIMULUS FADING IN REMEDIAL AND SPECIAL EDUCATION SETTINGS

Barbara L. Andersen, David Pomerantz & William H. Redd

University of Illinois

During the last 15 years we have achieved remarkable gains in remedial and special education settings through behavioral interventions. Our teaching procedures and specially designed instructional materials are highly effective in improving children's performance or teaching criterion tasks. However, in many of our educational intervention programs the cues which gain stimulus control over the task behavior and improve immediate performance also become extremely salient. Later when these discriminative stimuli are not present, the target behaviors are not emitted. For example, instruction is often one-to-one where a special tutor might use idiosyncratic instructional methods--none of which are present in the child's regular classroom. In addition to this, the student rarely has the opportunity to learn to work under conditions that are not distraction free. Thus, when the student returns to his classroom he may fail to demonstrate his newly learned skills and his performance deteriorates because of one, the absence of powerful discriminative stimuli, and two, the presence of distractors.

To cope with this situation, researchers have suggested that specific generalization training procedures must be included within

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intervention programs. In devising such procedures, the similarity (or dissimilarity) between conditions or stimuli associated with training and those associated with the natural environment appears critical. Thus the presence of prompts, heavy reinforcement and a distraction free tutoring setting may do little to change the child's performance within a busy classroom. The motto for generalization thus might be: "Fade out the artificial; fade in the natural". In the case of one-to-one remedial training this would mean eliminating the tutor's stimulus control, immediate prompts and reinforcement, and teaching the child how to work in the midst of distracting stimuli.

Our research examined strategies for promoting transfer of newly acquired skills from a structured, one-to-one tutoring setting to an unstructured setting where children worked independently. A single-subject multiple baseline design with replications was used to compare skill transfer resulting from two training methods. Subjects were first tutored on two experimental tasks under standard training procedures. Standard training procedures included one-to-one instruction in a quiet room, immediate reinforcement for task completion, and consistent physical and verbal prompting by the tutor. Following stable performance levels on both tasks, standard training was continued for one task and generalization training procedures introduced for the other. Generalization training procedures involved equating discriminative stimuli in the instructional setting

with those in the criterion environment. The object was to make the training setting gradually approximate the environment in which the new behaviors were to be maintained. Skill transfer for both tasks was assessed in the criterion setting prior to, during and following training.

For Study I subjects included three developmentally retarded children. Their performance was assessed on two tasks: matching pictures to a sample, and sorting objects according to size. Once stable performance levels had been achieved on both tasks with standard training, 2 of the subjects received generalization training on one task while standard training continued on the second task. This procedure was reversed for the third subject. Generalization training consisted of a "package" of procedures (delaying reinforcement, fading out the tutor's prompts and his presence, and fading in distracting stimuli, classmates engaged in play activities) which were administered sequentially. Following completion of generalization training for the selected task, training was then applied to the other task. That is, subjects received generalization training on both tasks but training on one task was delayed. A probe trial assessing skill transfer on both tasks was conducted in the child's classroom following the completion of each phase of training. During the probes the child was instructed to complete each experimental task while his classmates played around him in the room.

Results. All subjects worked rapidly and remained on-task for both tasks under standard training conditions. However, performance deteriorated during initial classroom assessment when direct supervision was absent and classmates were present. Classroom performance on a given task increased only after subjects received generalization training on that task. For both tasks, S_1 and S_2 required three components of generalization training (delayed reinforcement, faded prompts and programmed distraction) before performance equaled or approached that of typically high standard training levels. Moreover, when generalization training procedures were used with the second task, it required only one fifth as many trials as were necessary for the first task to reach high probe performance levels. S_3 required additional training components (programmed distraction and fading the tutor's presence) before probe performance improved.

In Study II, two six-year-old first grade children participated. Training tasks for these children included reading phrases and matching them with pictures, and reading and following simple directions. One subject received standard training on one task and generalization training on the other, while the second subject received just the opposite. The sequence for generalization training included gradually removing prompts, fading of the tutor's presence during task completion, and programming intermittant social reinforcement for task completion. Assessment sessions were conducted prior to, during, and after instituting generalization training.

Results. The results replicated those of Study I. Both subjects exhibited high levels of accuracy on on task behavior for both tasks during initial standard-training conditions, and performance deteriorated on assessment probes prior to transfer training. For both subjects, final assessment showed clear performance differences between tasks: high performance maintained for the generalization training task with marked deterioration for the non-trained task during test probes.

Discussion

Before generalization training was begun, little of the behavior established during training was exhibited in the classroom or when the child was left alone to work independently. However, after generalization training was completed, classroom performance equalled that under one-to-one supervision.

The specific generalization training program employed in Study I appears to have some practical limitations for its use with retarded children. For instance, a considerable time investment was necessary before the program was successfully completed (i.e., 36, 71 and 74 training trials for S_1, S_2, and S_3). However, once one task had received generalization training, this appeared to facilitate subsequent generalization training on different tasks. For example, for S_1 and S_2 six and twelve trials, respectively, were required to complete generalization training of the second task as opposed to 30 to 59 trails on the first task.

While generalization training can solve the problem of transfer, gains must still be maintained in the natural environment. If, as in these studies, high levels of transfer occur, the gains achieved in training should be salient enough so that significant individuals (e.g., parents and teachers) are likely to reinforce them. Another promising implication is that skills which are established in one-to-one instruction could be elaborated in more economical instructional settings if they transfer.

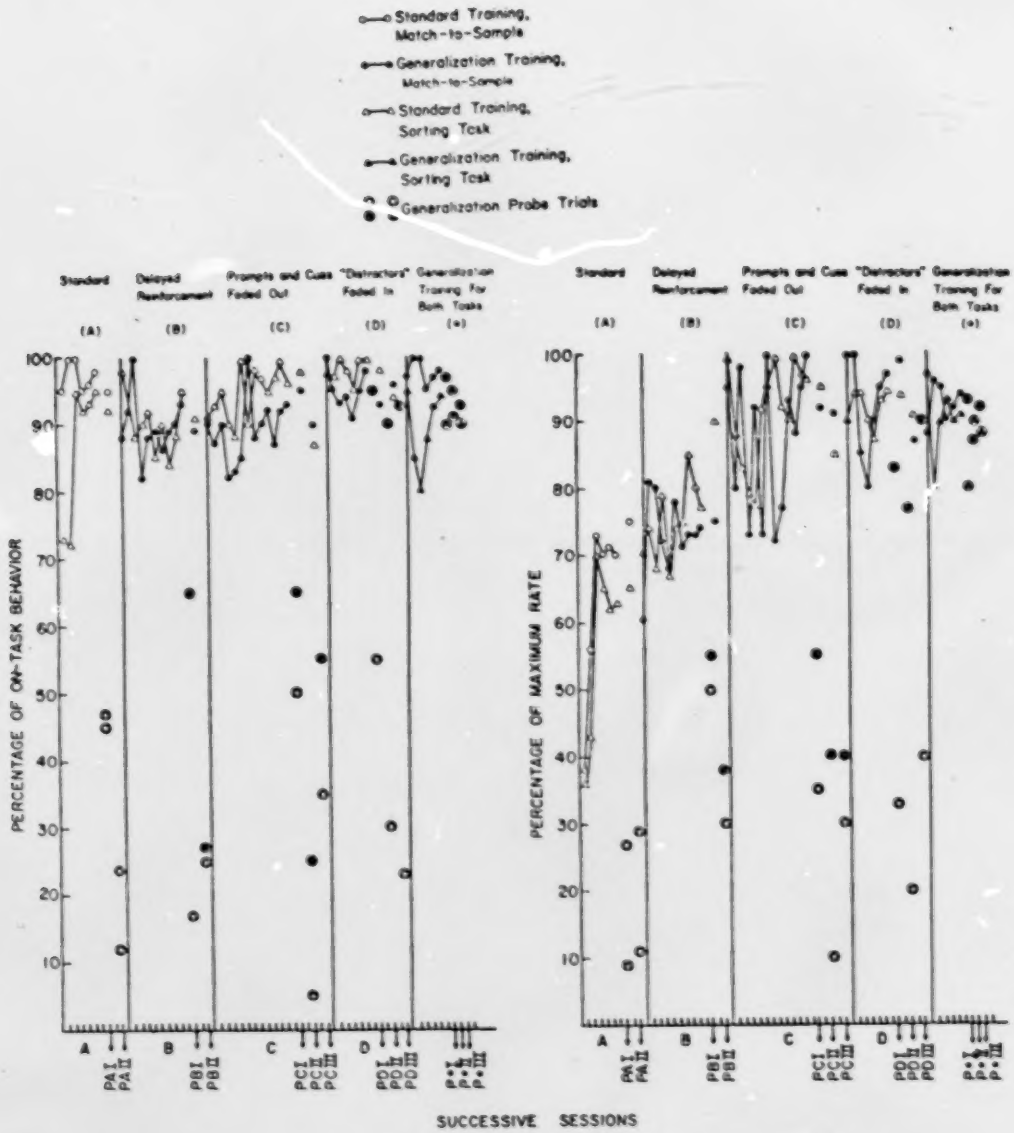

Figure 1. Percentages of On-Task Behavior and Maximum Performance Rate for S_1

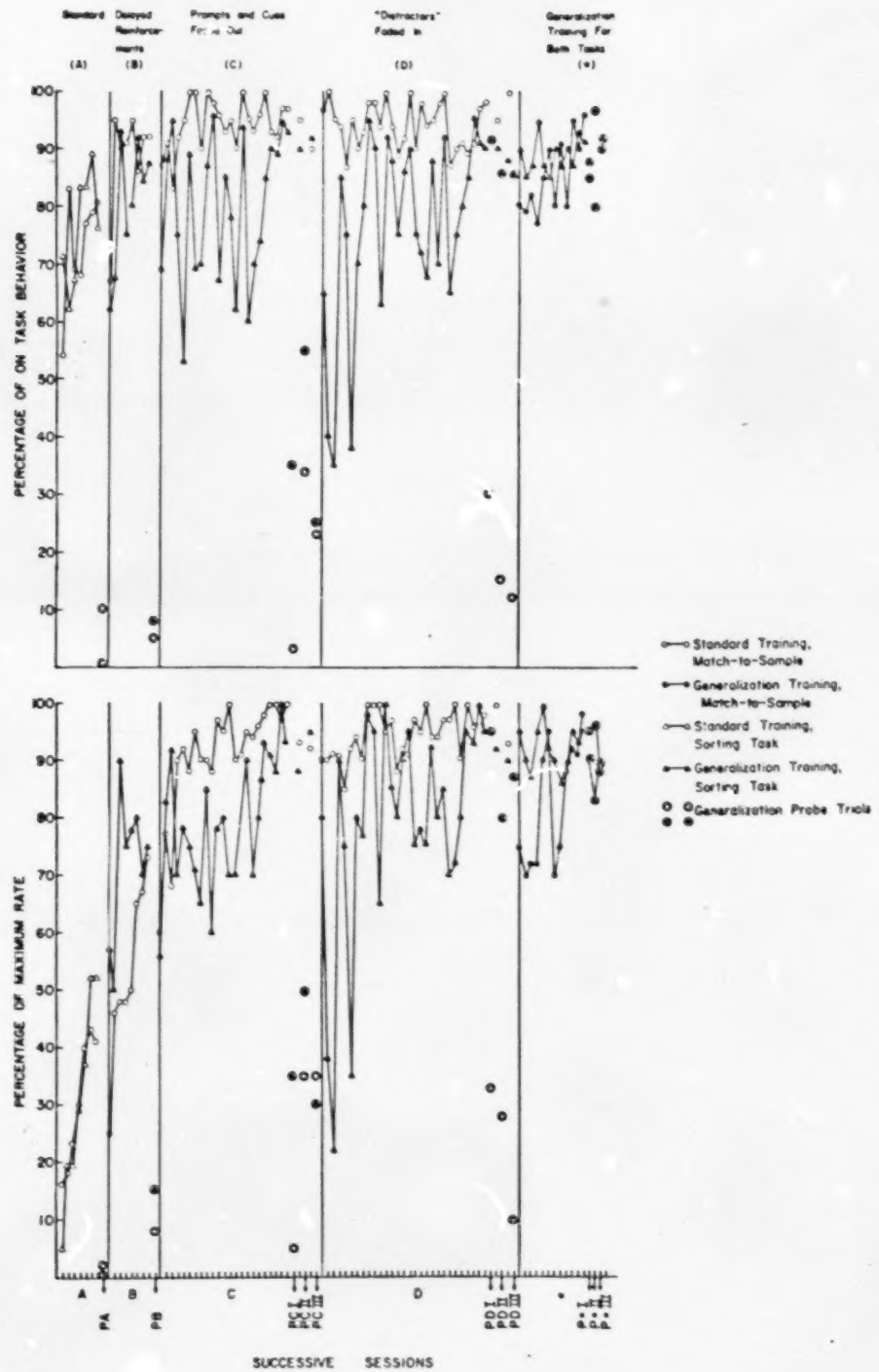

Figure 2. Percentages of On-Task Behavior and Maximum Performance Rate for S_2

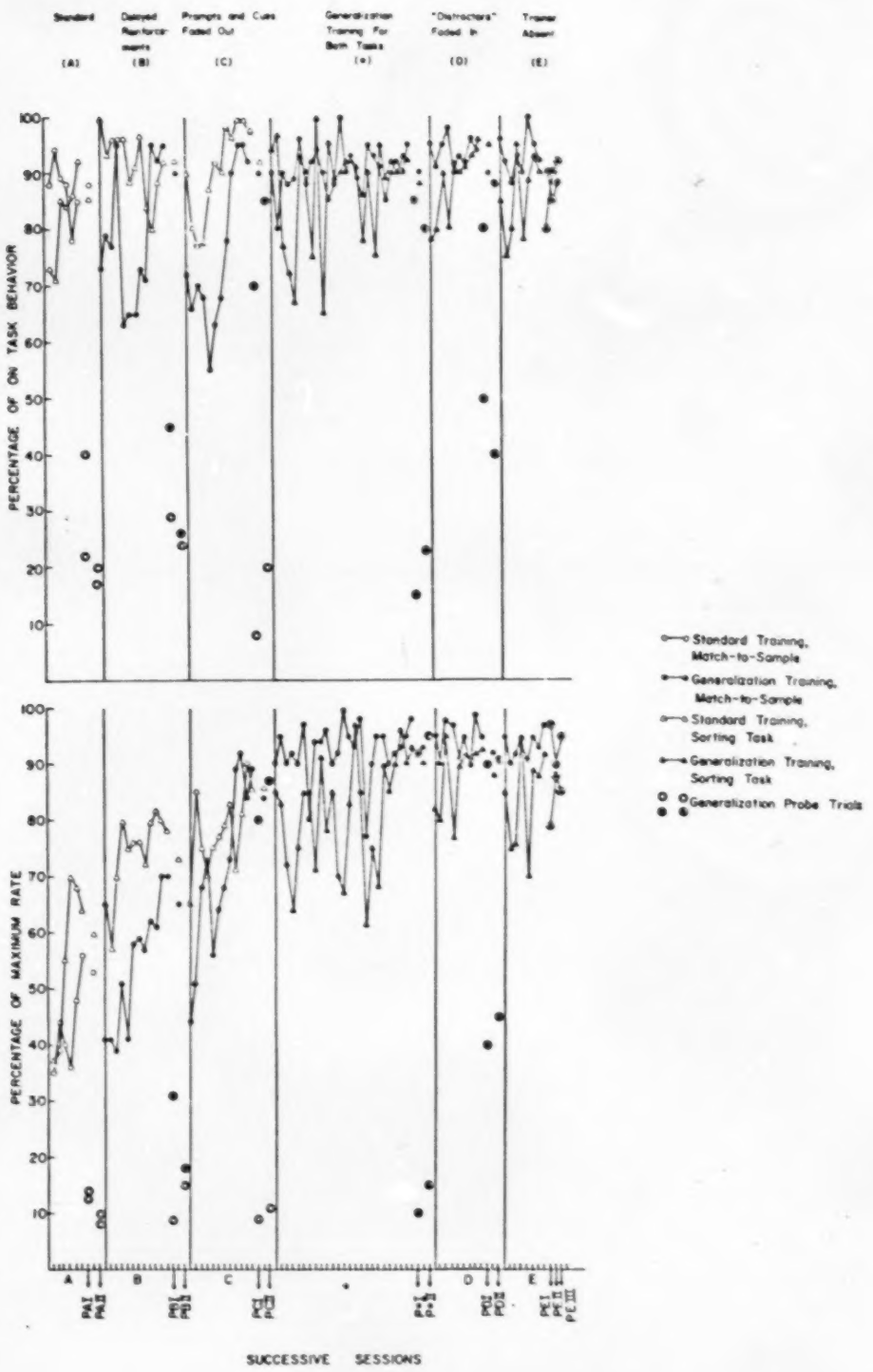

Figure 3. Percentages of On-Task Behavior and Maximum Performance Rate for S_3